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EXAMINER	
BERDICHEVSKY, MIRIAM	

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1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.**	**Applicant(s)**	
	10/510,661	YANG ET AL.	
	Examiner	**Art Unit**	
	MIRIAM BERDICHEVSKY	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-72_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-72_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _10/7/2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _8/16/2005_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

   1. Determining the scope and contents of the prior art.
   2. Ascertaining the differences between the prior art and the claims at issue.
   3. Resolving the level of ordinary skill in the pertinent art.
   4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-3, 6, 10-11 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pei (US 5682043) in view of Sarciftci (US 5331183).

As to claim 1, Pei teaches a composition of matter comprising:

- a mixture of a semi-conducting polymer and
- an ionic electrolyte wherein said semi-conducting polymer comprises a p-type polymer and an n-type electron acceptor (col. 3, lines 29-36 and col. 4, lines 14-19).

Pei is silent to the ionic electrolyte being present in the mixture in an amount ranging from 0.01 to 5 weight percent.

Further regarding claim 13, Pei is silent to the ionic electrolyte being present in the mixture in an amount ranging from 0.2 to 2.5 percent by weight.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use an electrolyte weight percent of about 1% because low electrolyte levels increases the semiconductor active region of the device especially since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art (MPEP 2144.05).

Regarding claim 2, Pei teaches that semi-conducting polymer is selected from the group consisting of poly(p-phenylene- vinylene) derivatives, polyfluorene derivatives and polythiophene derivatives (col. 7, lines 32-37).

Regarding claims 3 and 6, Pei teaches that the poly(p-phenylene-vinylene derivative is poly(2- methoxy-5-(2'-ethyl-hexyloxy)-l,4-phenylene vinylene).

Regarding claims 10-11, Pei teaches that the ionic electrolyte is $LiCF_3SO_3$ (col. 12, line 25-26).

Regarding claims 14-15, Pei teaches that the ionic electrolyte is a polymeric ionic electrolyte comprising the ionic electrolyte in combination with polyethylene oxide (col. 8, lines 32-65).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pei (US 5682043) as applied to claim 1, and further in view of Kaneto (*Carrier transports in organic materials related to functional nanometric interface controlled electronic NICE devices*).

Regarding claim 4, Pei is silent to the polyflouorene derivative is selected from the group consisting of poly(9,9'- dioctylfluorene), poly(9,9'-dioctylfluorene-co-benzothiadiazole), and poly(9,9'-dioctylfluorene-co-bls-N,N -(4-butylphenyl)-bxs-N,N -phenyl-1,4-phenylenediamine).

Kaneto teaches the use of polythiophenes, poly(p-phenylene-vinylene)s and polyfluorenes, specifically poly(9,9'- dioctylfluorene), as organic semiconductors for use in LEDs and solar cells (page 249, left col. and Table 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use poly(9,9'- dioctylfluorene) of Kaneto in Pei because poly(9,9'-dioctylfluorene) was an art known equivalent at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute for poly(p-phenylene vinylene). Furthermore, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice (MPEP 2144.07).

5. Claims 5, 7-9, 12, 16-21, 23-39, 41-57 and 59-72are rejected under 35 U.S.C. 103(a) as being unpatentable over Pei and Sariciftci.

Regarding claim 5, Pei teaches the use of polythiophene derivatives (col. 14, lines 39-44) but is silent to selecting the derivative from the group consisting of poly(3-alkylthiophene), poly(3-(4-octyl-phenyl)-2,2-bithiophene and poly(3-(4'-(l",4",7"-trioxaoctyl) thiophene).

Sariciftci teaches use of poly(3- alkylthiophene) (Figure 1k) as a semi-conducting polymer for solar cells.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use poly(3- alkylthiophene) of Sariciftici in Pei because the conjugated polymer system of Sariciftci offers several advantages such as simplified fabrication, as taught by Sariciftici (col. 3, line 59- col. 4, line 6). In addition, poly(3- alkylthiophene) was an art known equivalent at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute for poly(p-phenylene vinylene). Furthermore, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice (MPEP 2144.07).

Regarding claims 7-9, Pei is silent to the use of C_{60} as the n-type electron acceptor material.

Sariciftici teaches using C_{60} as the n-type electron acceptor material in a solar cell (col. 3, lines 23-29).

It would have been obvious to one of ordinary skill at the time of the invention to use the fullerene of Sariciftici in Pei because the fullerene-conjugated polymer system offers several advantages such as simplified fabrication, as taught by Sariciftici (col. 3, line 59- col. 4, line 6).

Regarding claim 12, Pei teaches that the ionic electrolyte is $LiCF_3SO_3$ (col. 12, line 25-26).

Regarding claim 16, Pei teaches the use poly(2-methoxy-5-(2'-ethyl-hexyloxy)-I,4-phenylene vinylene), and the ionic electrolyte is $LiCF_3S0_3$ (col. 12, lines 21-25) but is silent to the use of C_{60} as the n-type electron acceptor material.

Sariciftici teaches using C_{60} as the n-type electron acceptor material in a solar cell (col. 3, lines 23-29).

It would have been obvious to one of ordinary skill at the time of the invention to use the fullerene of Sariciftici in Pei because the fullerene-conjugated polymer system offers several advantages such as simplified fabrication, as taught by Sariciftici (col. 3, line 59- col. 4, line 6).

Regarding claims 17 and 18, modified Pei is silent to the amount of ionic electrolyte being about 1 weight percent.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use an electrolyte weight percent of about 1% because low electrolyte levels increases the semiconductor active region of the device especially since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art (MPEP 2144.05).

Regarding claim 19, Pei teaches the composition of claim 1, see discussion above, in the form of a film having an anode located on a first side of the film and a cathode located on the second side of the film (col. 3, lines 29-35 and lines 53-65) but is silent to he composition being used in a solar cell. One of ordinary skill in the solar cell art at the time of the invention would have looked to the teachings of LEDs because they require equivalent materials and equivalent structures and are therefore related arts, as seen in Pei and Sariciftci (see above paragraphs).

Regarding claim 20, Pei teaches that semi-conducting polymer is selected from the group consisting of poly(p-phenylene- vinylene) derivatives, polyfluorene derivatives and polythiophene derivatives (col. 7, lines 32-37).

Regarding claims 21 and 24, Pei teaches that the poly(p-phenylene-vinylene derivative is poly(2- methoxy-5-(2'-ethyl-hexyloxy)-l,4-phenylene vinylene).

Regarding claim 23, Pei teaches the use of polythiophene derivatives (col. 14, lines 39-44) but is silent to selecting the derivative from the group consisting of poly(3-alkylthiophene), poly(3-(4-octyl-phenyl)-2,2-bithiophene and poly(3-(4'-(l",4",7"-trioxaoctyl) thiophene).

Sariciftci teaches use of poly(3- alkylthiophene) (Figure 1k) as a semi-conducting polymer for solar cells.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use poly(3- alkylthiophene) of Sariciftici in Pei because the conjugated polymer system of Sariciftci offers several advantages such as simplified fabrication, as taught by Sariciftici (col. 3, line 59- col. 4, line 6). In addition, poly(3- alkylthiophene) was an art known equivalent at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute for poly(p-phenylene vinylene). Furthermore, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice (MPEP 2144.07).

Regarding claims 25-27, Pei is silent to the use of C_{60} as the n-type electron acceptor material.

Sariciftici teaches using C_{60} as the n-type electron acceptor material in a solar cell (col. 3, lines 23-29).

It would have been obvious to one of ordinary skill at the time of the invention to use the fullerene of Sariciftici in Pei because the fullerene-conjugated polymer system offers several advantages such as simplified fabrication, as taught by Sariciftici (col. 3, line 59- col. 4, line 6).

Regarding claims 28-30, Pei teaches that the ionic electrolyte is $LiCF_3SO_3$ (col. 12, line 25-26).

Regarding claim 31, modified Pei is silent to the amount of ionic electrolyte being between 0.2 and 2.5 weight percent.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use an electrolyte weight percent of between 0.2 and 2.5% because low electrolyte levels increases the semiconductor active region of the device especially since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art (MPEP 2144.05).

Regarding claims 32-33, Pei teaches that the ionic electrolyte is a polymeric ionic electrolyte comprising the ionic electrolyte in combination with polyethylene oxide (col. 8, lines 32-65).

Regarding claim 34, Pei teaches the use poly(2-methoxy-5-(2'-ethyl-hexyloxy)-l,4-phenylene vinylene), and the ionic electrolyte is $LiCF_3S0_3$ (col. 12, lines 21-25) but is silent to the use of C_{60} as the n-type electron acceptor material.

Sariciftici teaches using C_{60} as the n-type electron acceptor material in a solar cell (col. 3, lines 23-29).

It would have been obvious to one of ordinary skill at the time of the invention to use the fullerene of Sariciftici in Pei because the fullerene-conjugated polymer system offers several advantages such as simplified fabrication, as taught by Sariciftici (col. 3, line 59- col. 4, line 6). As discussed above regarding claim 19, one of ordinary skill in the solar cell art at the time of the invention would have looked to the teachings of LEDs because they require equivalent materials and equivalent structures and are therefore related arts, as seen in Pei and Sariciftci (see above paragraphs).

Regarding claim 35-36, modified Pei is silent to the amount of ionic electrolyte being about 1 weight percent.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use an electrolyte weight percent being about 1% because low electrolyte levels increases the semiconductor active region of the device especially since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art (MPEP 2144.05).

Regarding claims 37 and 55, Pei teaches a method of making a device which comprises: providing the composition of claim 1, see discussion above, in the form of a film, placing an anode located on a first side of the film and placing a cathode located on the second side of the film (col. 3, lines 29-35 and lines 53-65) but is silent to he composition being used in a solar cell. One of ordinary skill in the solar cell art at the time of the invention would have looked to the teachings of LEDs because they require

equivalent materials and equivalent structures and are therefore related arts, as seen in Pei and Sariciftci (see above paragraphs). Further regarding claim 55, exposing said solar cell to sufficient sunlight to generate an electrical potential between said anode and said cathode is the mechanism by which a solar cell functions and thus would have been an obvious application of the solar cell comprising the structure of claim 37.

Regarding claims 38 and 56, Pei teaches that semi-conducting polymer is selected from the group consisting of poly(p-phenylene- vinylene) derivatives, polyfluorene derivatives and polythiophene derivatives (col. 7, lines 32-37).

Regarding claims 39, 42, 57 and 60, Pei teaches that the poly(p-phenylene- vinylene derivative is poly(2- methoxy-5-(2'-ethyl-hexyloxy)-l,4-phenylene vinylene).

Regarding claims 41 and 59, Pei teaches the use of polythiophene derivatives (col. 14, lines 39-44) but is silent to selecting the derivative from the group consisting of poly(3- alkylthiophene), poly(3-(4-octyl-phenyl)-2,2-bithiophene and poly(3-(4'-(l",4",7"-trioxaoctyl) thiophene).

Sariciftci teaches use of poly(3- alkylthiophene) (Figure 1k) as a semi-conducting polymer for solar cells.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use poly(3- alkylthiophene) of Sariciftici in Pei because the conjugated polymer system of Sariciftci offers several advantages such as simplified fabrication, as taught by Sariciftici (col. 3, line 59- col. 4, line 6). In addition, poly(3- alkylthiophene) was an art known equivalent at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute for poly(p-phenylene vinylene).

Furthermore, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice (MPEP 2144.07).

Regarding claims 43-45 and 61-63, Pei is silent to the use of C_{60} as the n-type electron acceptor material.

Sariciftici teaches using C_{60} as the n-type electron acceptor material in a solar cell (col. 3, lines 23-29).

It would have been obvious to one of ordinary skill at the time of the invention to use the fullerene of Sariciftici in Pei because the fullerene-conjugated polymer system offers several advantages such as simplified fabrication, as taught by Sariciftici (col. 3, line 59- col. 4, line 6).

Regarding claims 46-48 and 64-66, Pei teaches that the ionic electrolyte is $LiCF_3SO_3$ (col. 12, line 25-26).

Regarding claims 49 and 67, modified Pei is silent to the amount of ionic electrolyte being between 0.2 and 2.5 weight percent.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use an electrolyte weight percent of between 0.2 and 2.5% because low electrolyte levels increases the semiconductor active region of the device especially since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art (MPEP 2144.05).

Regarding claims 50-51 and 68-69, Pei teaches that the ionic electrolyte is a polymeric ionic electrolyte comprising the ionic electrolyte in combination with polyethylene oxide (col. 8, lines 32-65).

Regarding claims 52 and 70, Pei teaches the use poly(2-methoxy-5-(2'-ethyl-hexyloxy)-l,4-phenylene vinylene), and the ionic electrolyte is $LiCF_3S0_3$ (col. 12, lines 21-25) but is silent to the use of C_{60} as the n-type electron acceptor material.

Sariciftici teaches using C_{60} as the n-type electron acceptor material in a solar cell (col. 3, lines 23-29).

It would have been obvious to one of ordinary skill at the time of the invention to use the fullerene of Sariciftici in Pei because the fullerene-conjugated polymer system offers several advantages such as simplified fabrication, as taught by Sariciftici (col. 3, line 59- col. 4, line 6). As discussed above regarding claim 19, one of ordinary skill in the solar cell art at the time of the invention would have looked to the teachings of LEDs because they require equivalent materials and equivalent structures and are therefore related arts, as seen in Pei and Sariciftci (see above paragraphs).

Regarding claims 53-54 and 71-72, modified Pei is silent to the amount of ionic electrolyte being about 1 weight percent.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use an electrolyte weight percent being about 1% because low electrolyte levels increases the semiconductor active region of the device especially since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art (MPEP 2144.05).

6. Claims 22, 40 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pei and Sariciftci in view of Kaneto.

Regarding claim 22, 40 and 58, Pei is silent to the polyflouorene derivative is selected from the group consisting of poly(9,9'- dioctylfluorene), poly(9,9'-dioctylfluorene-co-benzothiadiazole), and poly(9,9'-dioctylfluorene-co-bls-N,N -(4-butylphenyl)-bxs-N,N -phenyl-1,4-phenylenediamine).

Kaneto teaches the use of polythiophenes, poly(p-phenylene-vinylene)s and polyfluorenes, specifically poly(9,9'- dioctylfluorene), as organic semiconductors for use in LEDs and solar cells (page 249, left col. and Table 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use poly(9,9'- dioctylfluorene) of Kaneto in Pei because poly(9,9'-dioctylfluorene) was an art known equivalent at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute for poly(p-phenylene vinylene). Furthermore, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice (MPEP 2144.07).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **MIRIAM BERDICHEVSKY** whose telephone number is (571)270-5256. The examiner can normally be reached on M-Th, 10am-8pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795